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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/972,619 | | Paul LoRegio | 01W047 | 4332 |

7590 06/03/2003

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EXAMINER

STAHL, MICHAEL J

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/972,619 | LOREGIO, PAUL |
| | Examiner Mike Stahl | Art Unit 2874 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-19 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-19 is/are rejected.
 7) Claim(s) ____ is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 08 October 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: ____. |

Information Disclosure Statement

The references submitted 8 October 2001 have been considered. An initialed copy of the citation form is attached.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 8-12, 14, and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (US 5737104).

Lee discloses a multiplexing device (fig. 3A) comprising a bandpass filter **20** that passes a first wavelength λ_1 at a first angle of incidence and a second wavelength λ_2 at a second angle of incidence; a light source **301** that directs a first incident beam including light of the first and second wavelengths at the first angle of incidence onto the bandpass filter **20**, which passes light at the first wavelength λ_1 and reflects a first reflected beam therefrom; and a first light receptor / redirector **302/322/303** that receives the first reflected beam and redirects it as a second incident beam back onto the bandpass filter **20** at the second angle of incidence, wherein the second wavelength λ_2 passes through the filter and a second reflected beam is reflected away from the filter. See the description at col. 6 lines 16-38. The device just described fully satisfies independent claim 1. As to independent claim 9, the bandpass filter **20** may be a thin-film interference filter (col. 4 lines 43-61), which typically comprises a substrate and a multilayer

dielectric stack as is known in the art (see e.g. the Scobey patent 5583683 cited in the information disclosure statement). The Lee device also satisfies independent claim 17 in that the first received beam in the Lee arrangement is the first reflected beam.

As to claims 2, 10, and 19, the Lee device includes a first receiver **311** positioned to receive the passed light at λ_1 and a second receiver **312** positioned to receive the passed light at λ_2 .

As to claims 3 and 11, the bandpass filter **20** passes a third light wavelength λ_3 at a third angle of incidence, the incident beam includes λ_3 , and the device further includes a second light receptor/redirector **304/325/305** that receives the second reflected beam and redirects it as a third incident beam back onto the filter **20** at the third angle of incidence, wherein the third wavelength λ_3 passes through the reflector and a third reflected beam is reflected therefrom (col. 6 lines 35-45).

As to claims 4 and 12, the first, second, and third incident beams appear to be coplanar.

As to claims 6 and 14, the first light receptor/redirector **302/322/303** comprises a receiving collimator **302**, a redirecting collimator **303**, and an optical link **322** between them. The link **322** is an optical fiber as required by claims 8 and 16.

As to claim 18, fig. 4 shows an alternate embodiment in which wavelengths are mixed. In terms of parent claim 17, this embodiment includes a bandpass filter **20** as described above; a light source **403** that directs a first incident beam including light of a first wavelength λ_3 at a first angle of incidence onto the filter **20**, wherein the filter passes the first wavelength λ_3 and reflects a first reflected beam therefrom (the reflected beam including λ_4); and a first light receptor/redirector **412/422/413** that receives the first transmitted beam and redirects it back onto

the filter at the second angle of incidence as a second incident beam, wherein the filter reflects a second reflected beam (including λ_3) therefrom. As additionally required by claim 18, a second light source 402 directs a second incident beam including a second wavelength λ_2 onto the filter at the second angle of incidence, so that light of the second wavelength λ_2 passes through the filter and mixes with the second reflected beam which includes λ_3 .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 7, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (cited above).

As to claims 5 and 13, Lee does not appear to specifically disclose having the first, second and third incident beams in a non-coplanar arrangement. It is not known whether fig. 3A is meant to be a projection of a three-dimensional arrangement or if the various beams are in fact coplanar. However, even assuming that they are coplanar, it was known by those of ordinary skill in the art at the time the invention was made that the wavelength passed by the type of bandpass filter 20 used by Lee depends on the incident angle θ (which is defined relative to the normal to the surface of the filter) but has no azimuthal dependence as shown in the equation at col. 4 line 59. Accordingly the various incident beams are not constrained to lie in a single common plane. Lee recognizes the potential for crowding of components when large numbers of

wavelengths are involved and proposes one solution to this problem (col. 8 lines 31-62; fig. 5).

A person having ordinary skill in the art would have recognized that further density could be achieved by spacing the various collimators in a three-dimensional manner, i.e., so that not all the incident beams are coplanar. It would have been obvious to a skilled person to modify Lee in this way since it is generally considered desirable to increase the signal handling capacity of multiplexing devices.

Regarding claims 7 and 15, Lee discloses only optical fibers as the optical links between the receiving and redirecting collimators. It is evident that this is not a critical aspect of Lee's device and that one could employ any arrangement which effectively turns the reflected beams around to be incident on filter 20 at the correct angle for the corresponding wavelength to be passed. A person having ordinary skill in the art would have found it obvious to use mirrors instead of fibers since the fiber-collimator assemblies of figs. 10A and 10B are typically more expensive than simple mirrors, and since using mirrors would enable a more compact device because there would no longer be a need for extra space to account for the minimum bend radius of the fibers.

Conclusion

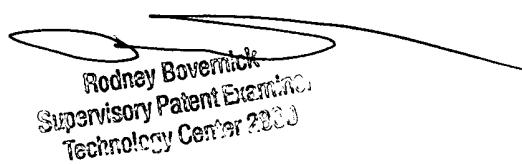
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5808763, US 6008920, US 6292298, US 2001/0055442, US 2003/0002101, and US 2003/0095744 all disclose multiplexing/demultiplexing devices which make use of the dependence of passed wavelength on the incident angle (the latter two references were published too recently to qualify as prior art).

Any inquiry concerning this communication should be directed to Mike Stahl at (703) 305-1520. Official communications eligible for submission by facsimile may be faxed to (703) 308-7724 or (703) 308-7722. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at (703) 308-0956 or to the technical support staff supervisor at (703) 308-3072.

MJS

Michael J. Stahl
Patent Examiner
Art Unit 2874

29 May 2003


Rodney Bovemba
Supervisory Patent Examiner
Technology Center 2800